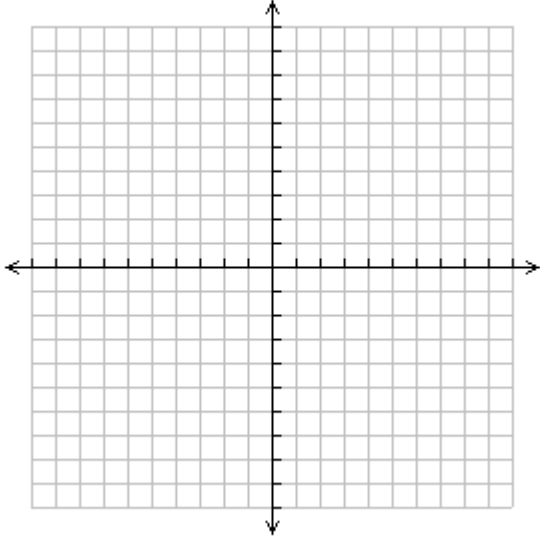
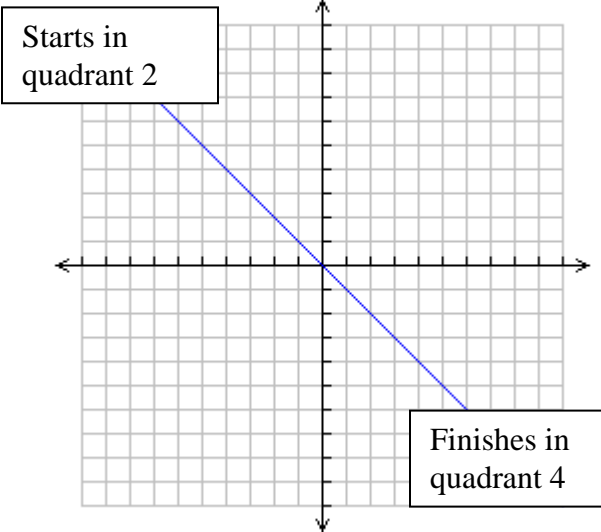
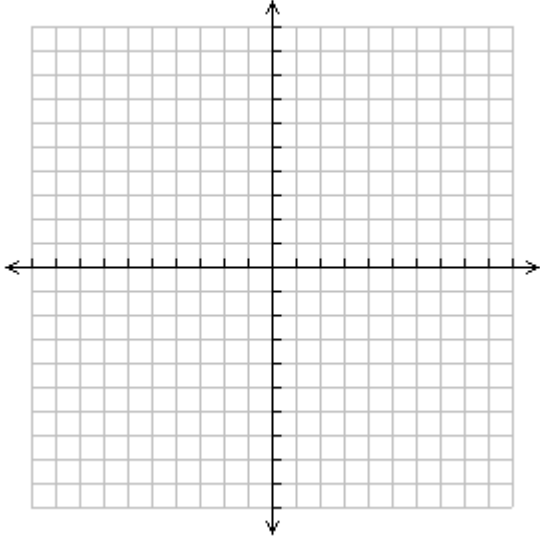
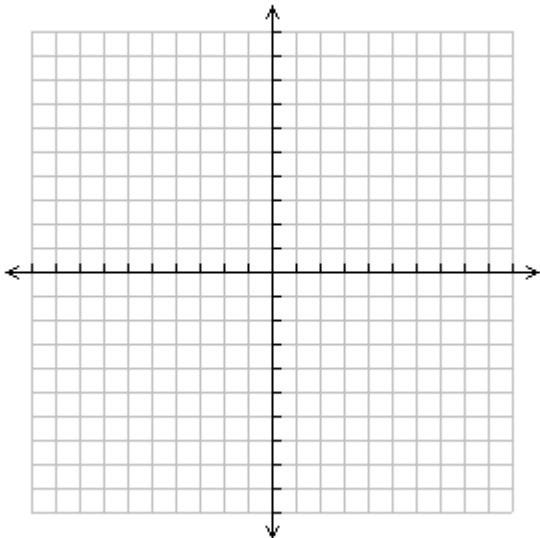
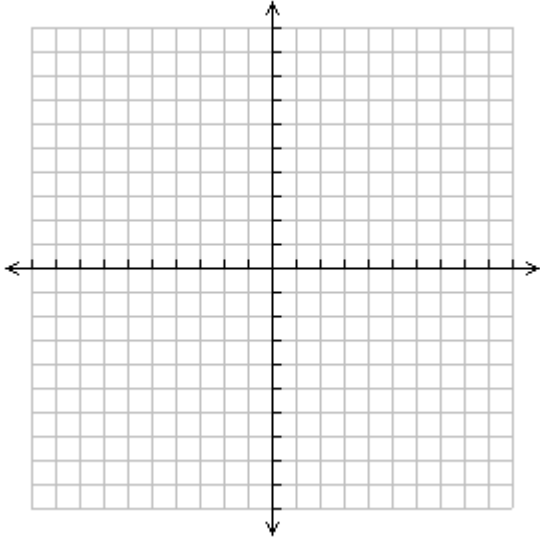
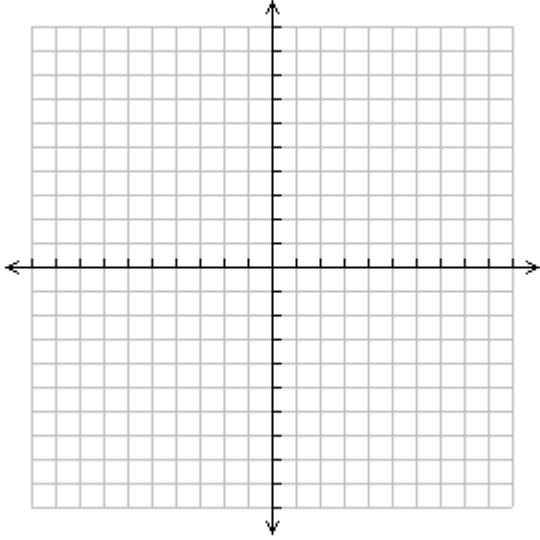


Time to investigate polynomial functions

Part 1: Fill-in the chart below and look for any emerging patterns. Use GraphCalc to graph the functions. Function #2 has been completed for you. Use it as your model.

Polynomial Function	Sketch of the function	Degree	Sign (positive or negative function)	Start and End Quadrants (left → right)
$y = x$				
$y = -x$		Odd (first degree polynomial)	Negative	2 → 4

$y = x(x - 1)(x + 2)$				
$y = -x(x - 1)(x + 2)$				

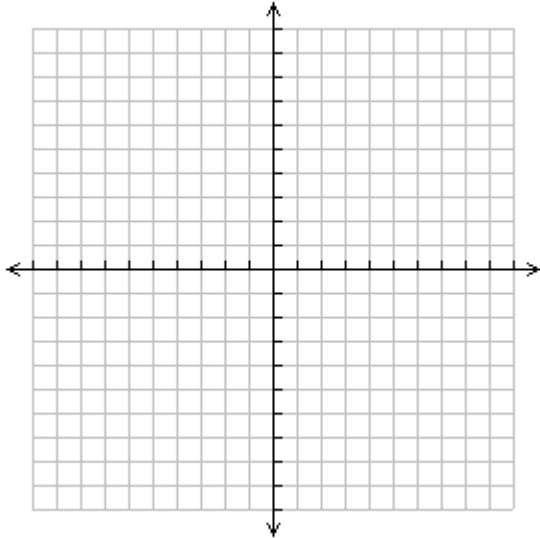
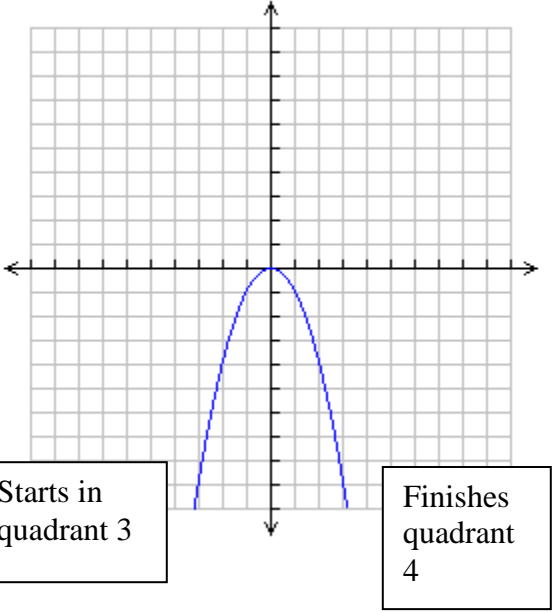
$y = (x+1)^2(x-2)$				
$y = -(x+1)^2(x-2)$				

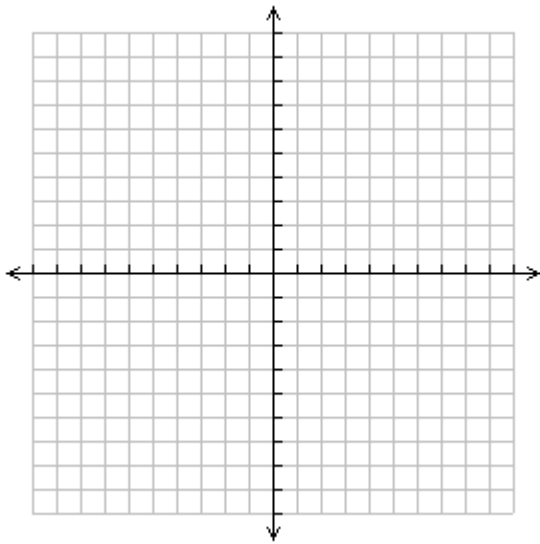
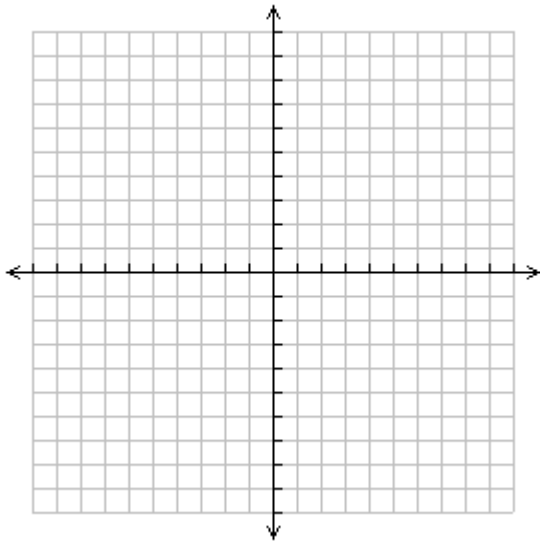
Complete the following sentences:

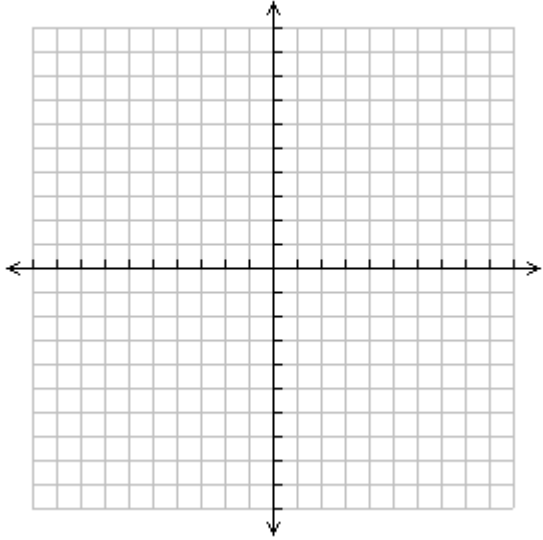
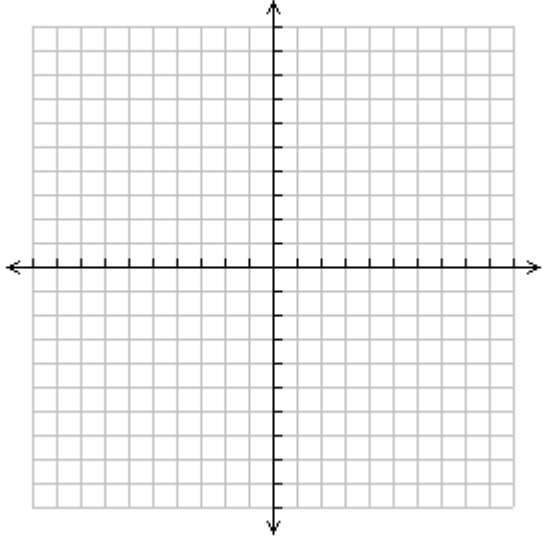
1. When a polynomial function is **odd** and **negative**, it starts in quadrant _____ and ends in quadrant _____ moving left to right.
2. When a polynomial function is **odd** and **positive**, it starts in quadrant _____ and ends in quadrant _____ moving left to right.

Time to investigate polynomial functions:

Part 2: Fill-in the chart below and look for any emerging patterns. Use GraphCalc to graph the functions. Function #2 has been completed for you. Use it as your model.

Polynomial Function	Sketch of the function	Degree	Sign (positive or negative function)	Sart and End Quadrants (left → right)
$y = x^2$				
$y = -x^2$	 <div>Starts in quadrant 3</div> <div>Finishes quadrant 4</div>	Even (second degree polynomial)	Negative	3 → 4

$y = (x - 1)^2(x + 2)^2$				
$y = -(x - 1)^2(x + 2)^2$				

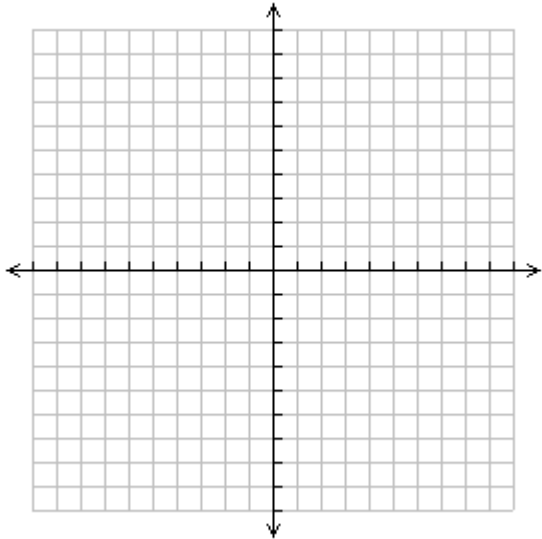
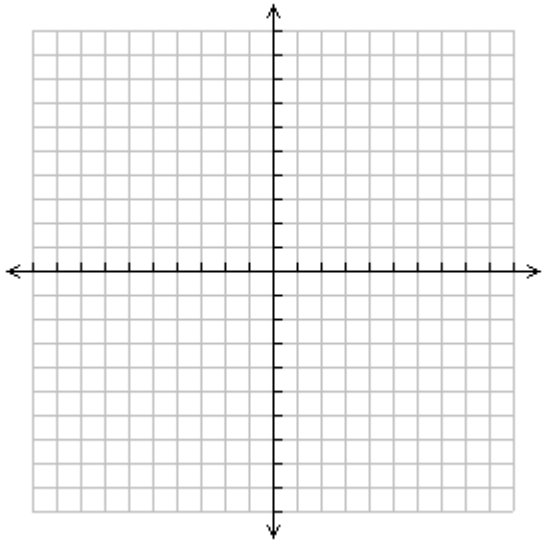
$y = x^2(x+1)^2$				
$y = -x^2(x+1)^2$				

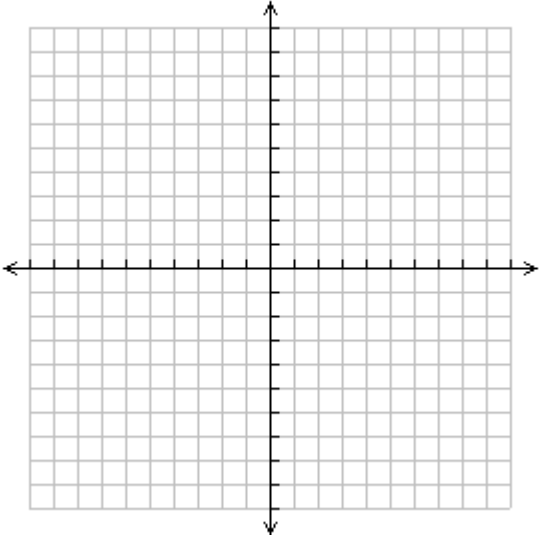
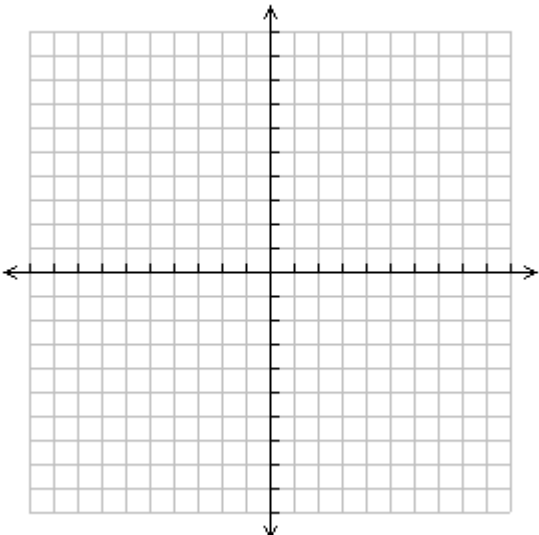
Complete the following sentences:

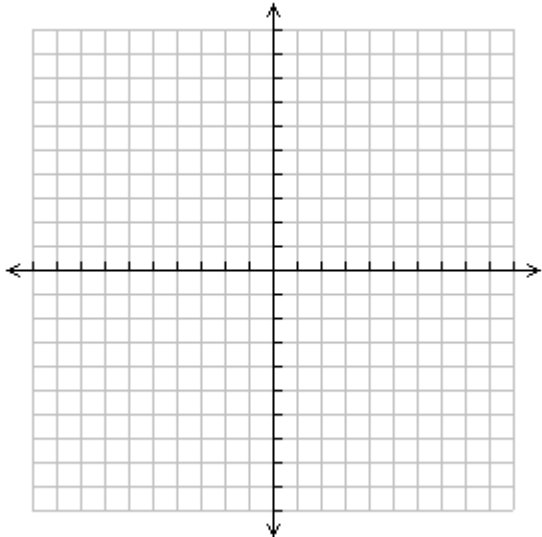
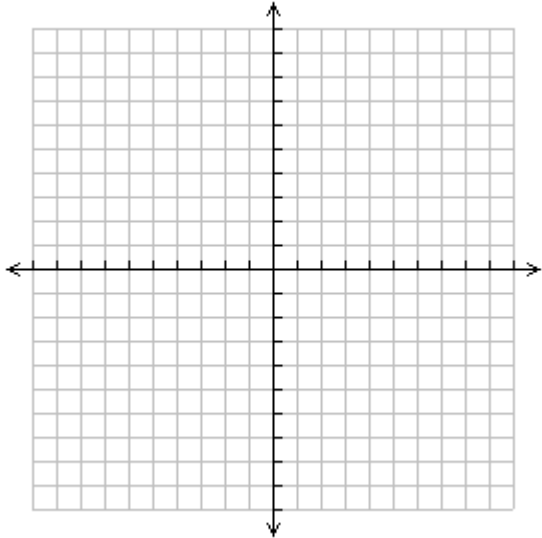
1. When a polynomial function is **even** and **negative**, it starts in quadrant _____ and ends in quadrant _____ moving left to right.
2. When a polynomial function is **even** and **positive**, it starts in quadrant _____ and ends in quadrant _____ moving left to right.

Time to investigate polynomial functions:

Part 3: Fill-in the chart below and look for any emerging patterns. Use GraphCalc to graph the functions.

Polynomial Functions	Sketch of the function	Degree	Sign (positive or negative function)	Quadrants (left → right)
$y = (x + 1)^2(x - 2)^4$				
$y = -(x - 3)^4(x + 2)^4$				

$y = (x - 1)(x + 2)^3$				
$y = -(x - 1)^3(x + 2)$				

$y = x^2(x+2)^2(x-3)$				
$y = -(x+2)^5(x-3)^2$				

Complete the following sentences:

1. When a polynomial function has a repeated **even** root, the graph of the function _____ at that root.
2. When a polynomial function has a repeated **odd** root greater than 1, the graph of the function _____ at that root.